

ORIGINAL

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August 31, 1999

Magalie Roman Salas, Secretary
Federal Communications Commission
445 12th Street SW
Washington DC

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In re: CC Docket No. 94-102
Oral Ex Parte Presentation

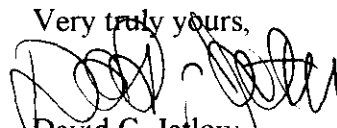
Dear Ms. Salas:

Pursuant to the provisions of Section 1.1206(b) of the Commission's rules, this letter will serve to advise you that on this date, Gregory Davis, William Lindsey, Bo Piekarski and John Pottle of Omnipoint Technologies, Inc. ("OTI") and the undersigned met with Kris Monteith, Nancy Boocker, Ron Netro, Dan Grosh and Won Kim of the Policy Division of the Wireless Telecommunications Bureau to discuss matters related to Phase II wireless E-911 ALI requirements.

OTI proposed that the Commission's existing Phase II ALI rules should require location accuracy for wireless E-911 calls to be determined using confidence levels associated with the Circular Error Probability ("CEP") of radial error. In addition, OTI proposed that the existing rules should be changed to require 67% of all wireless E-911 calls to be located within a circle of radius of 125 meters and 90% of all wireless E-911 calls to be located within a circle of radius of 250 meters.

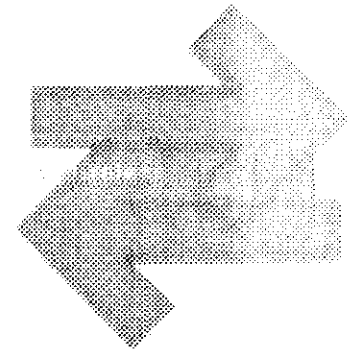
Copies of the materials provided to the participants in the meeting are attached.

Very truly yours,


David C. Jatlow
Counsel for Omnipoint Technologies, Inc.

cc: Kris Monteith, Esq.
Nancy Boocker, Esq.
Mr. Ron Netro
Won Kim, Esq.
Mr. Dan Grosh

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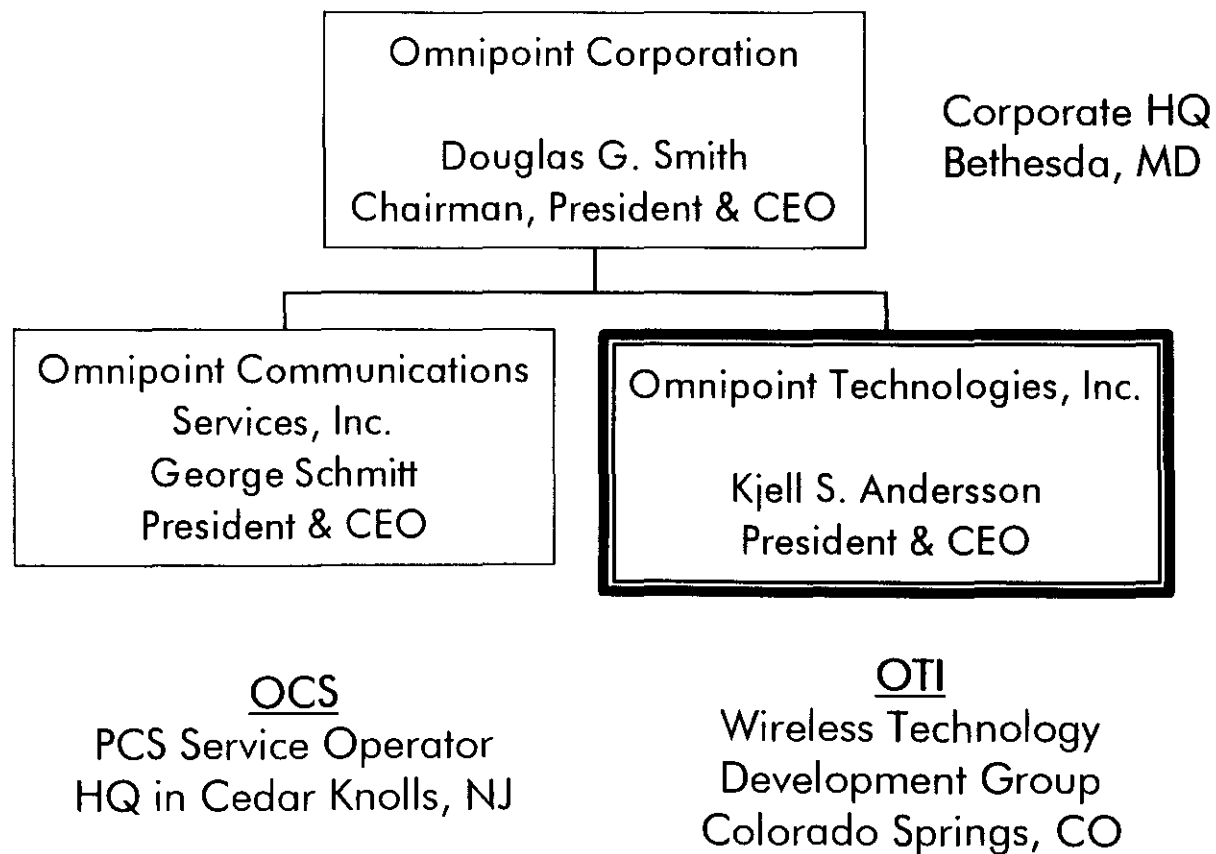
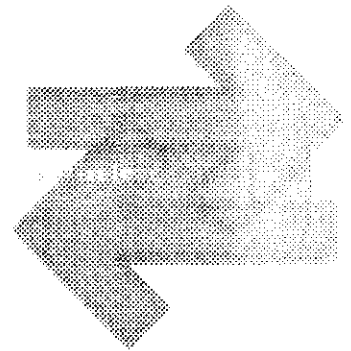


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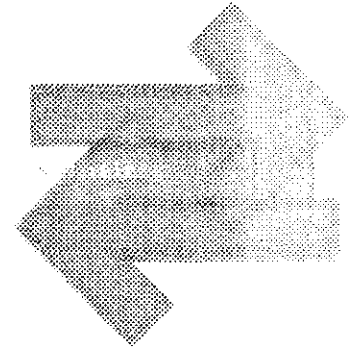
Location System Accuracy Requirements for Phase 2 E911

Omnipoint Technologies Incorporated
August 31, 1999

Omnipoint Corporation

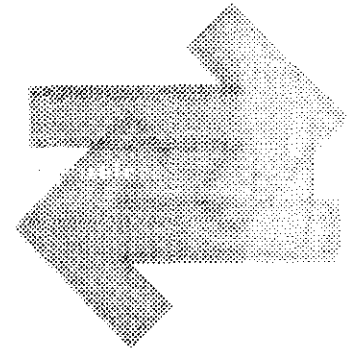


Omnipoint Technologies, Inc.



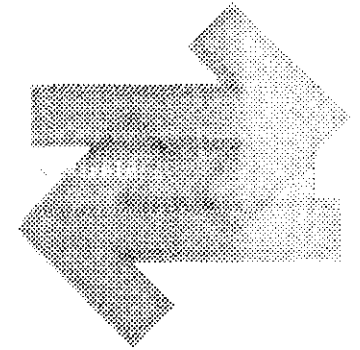
- Product Focus
 - Mobile Location for GSM
 - Wireless Modems for GSM
- Expertise in development of emerging wireless communications solutions including:
 - Systems & Network Engineering
 - Packet Data, e.g. EDGE and 3rd Generation
 - Product Development

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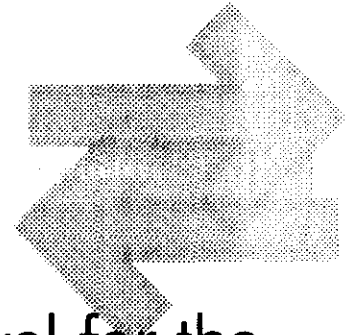
-
- Overview and Summary
 - The RMS Rule for Radial Error
 - Circular Error Probability
 - Interpretation of CEP
 - Single Location CEP Example
 - Location System Accuracy Recommendation

Overview and Summary



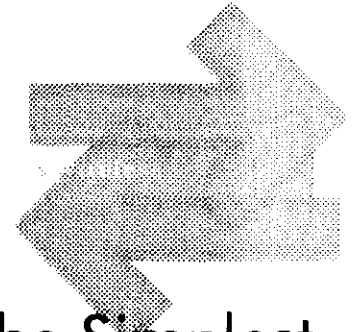
- PSAPs Need Confidence Levels for Location Estimates
- RMS Metric Does Not Provide Intended Confidence Levels
- OTI Proposes Circular Error Probability (CEP) as the Accuracy Metric for E911
 - Establishes Firm Confidence Levels for Location Estimates
 - Simplest to Apply, No Complex Statistical Modeling
 - Applicable to All Location Technologies

The RMS Rule for Radial Error



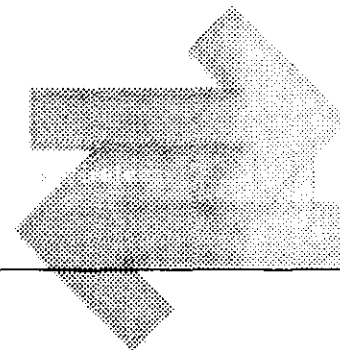
- Intent of RMS Rule Is to Provide a Confidence Level for the Location Estimate and to place some controls on the accuracy of all calls (MO&O Dec. '97, Para. 126)
- For a circular symmetric bi-variate Gaussian Distribution, the RMS metric provides a Confidence Level of ~67% (MO&O, Footnote 325)
 - Applies for uncorrelated, unbiased Gaussian variates only
- Unfortunately, Location Measurements Are Not Generally Uncorrelated and Unbiased Gaussian Variates
 - Desired Confidence Levels Not Apparent

The RMS Rule for Radial Error



- The Bi-Variate Gaussian Distribution is Perhaps the Simplest Approximation for the Distribution of Location Estimates
- Single RMS metric: insufficient information to establish a firm confidence level
 - Need up to 5 parameters to specify a Bi-Variate Gaussian Distribution
- RMS Rule Requires Modeling of the Probability Distribution
 - Complex Process
 - Subject to Interpretation
 - Difficult to Compare Results
 - Introduces Additional Error

Circular Error Probability



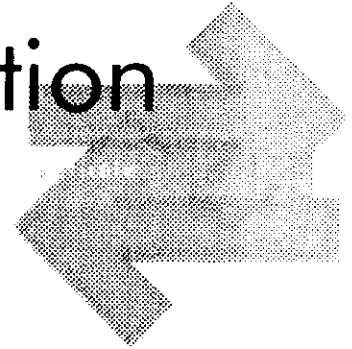
Accuracy Requirement Issue

- Confidence Levels should be specified to ensure location estimates are "on target".
- The Accuracy Requirement should be insensitive to the underlying probability distributions.
- The Accuracy Requirement should reduce "Fat Tails" in the radial error distribution.
- The Accuracy Requirement should account for biases in the location estimates.
- The Accuracy Requirement should be neutral with respect to technologies and manufacturers.
- The Accuracy Requirement should support evolution to an elevation metric as technology improves.

Solution

- ✓ CEP directly sets the confidence levels that location estimates are within the desired radius.
- ✓ CEP requires no knowledge of the underlying probability distributions. No complicated modeling or interpretation is needed.
- ✓ CEP with two confidence levels controls the tails of the radial error distribution.
- ✓ CEP measures biases directly.
- ✓ CEP can be applied to any location system technology.
- ✓ CEP gracefully evolves to Spherical Error Probability (SEP) which includes the z-axis.

Location Accuracy Recommendation



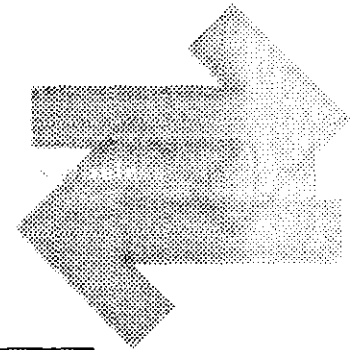
"Location accuracy for all E-911 calls shall be determined using confidence levels associated with the Circular Error Probability (CEP) of radial error.

(a) Sixty seven percent (67%) of all E-911 calls shall be located within a circle of radius 125 meters with the center of this circle being the actual location of the user.

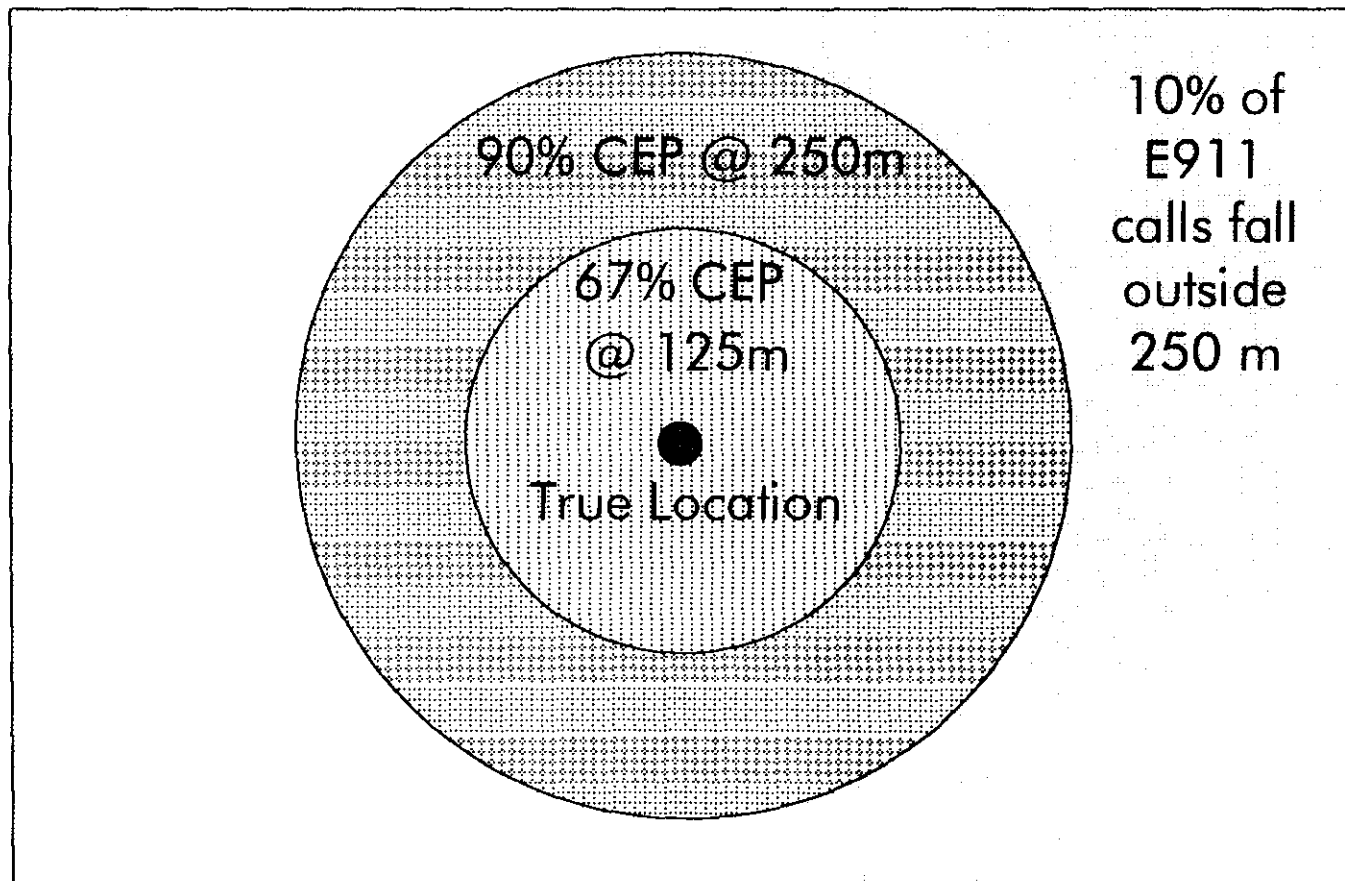
(b) Ninety percent (90%) of all E-911 calls shall be located within a circle of radius 250 meters with the center of this circle being the actual location of the user.

(c) The measured CEP value for (a) and (b) above shall be computed as an average of CEPs centered on a user's actual location."

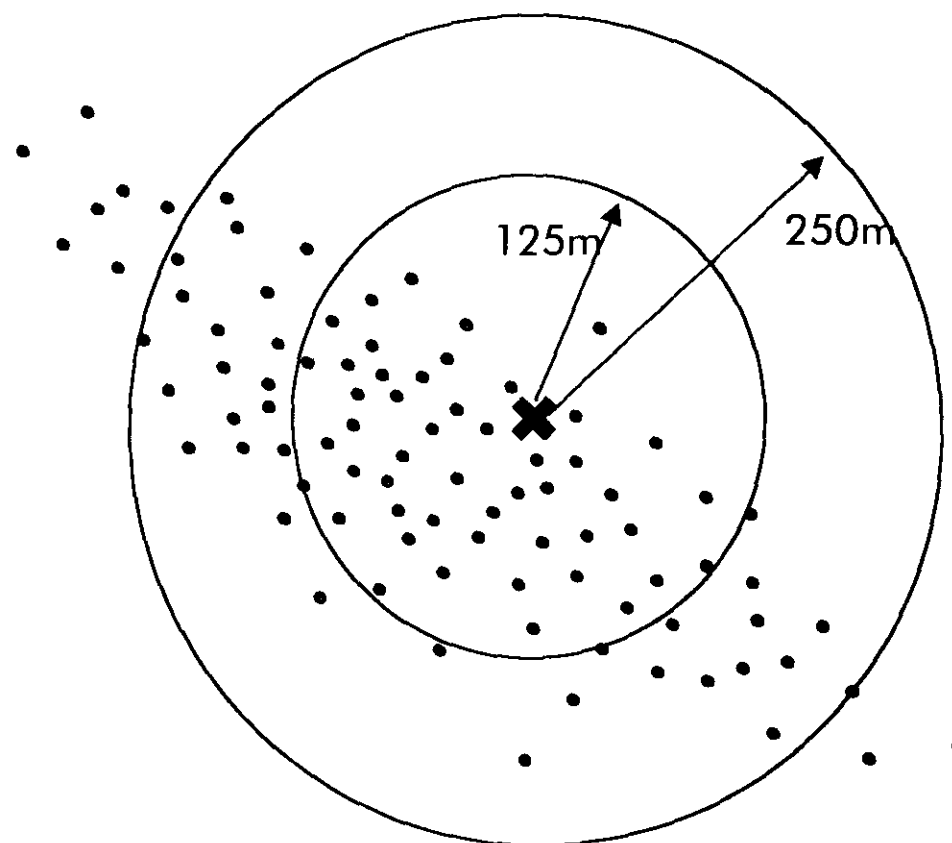
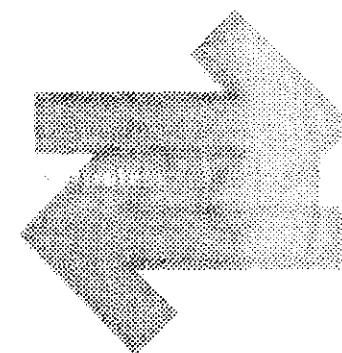
Interpretation of CEP



Set of All E-911 Calls



Single Location CEP Example



- ✕ True Location
- Estimated Location